

Dual Fuel Energy Conversion System for Diesel Engines

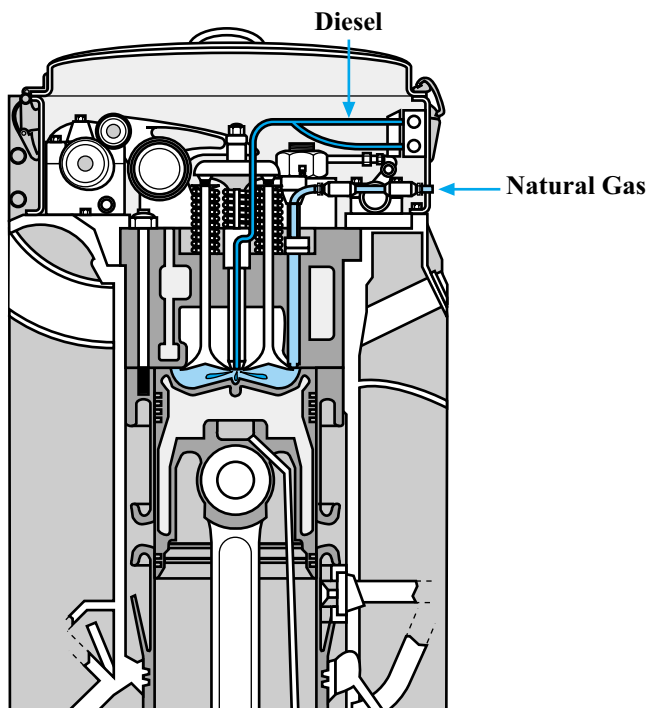


A Fuel-Powered, Liquefied Natural Gas Conversion System for Diesel Engines Greatly Reduces Emissions

With assistance from the Department of Energy's Inventions and Innovation Program, Energy Conversions, Inc. (ECI) developed and tested a system to convert a large diesel engine to dual-fuel usage. The new engine uses 90% natural gas as efficiently as diesel fuel while greatly reducing emissions. In addition, a natural gas engine requires much less maintenance, emits fewer pollutants, and operates just as safely as a diesel or gasoline engine.

ECI dual-fuel engine systems consist of specifically engineered pistons and heads, patented gas injectors, a supplemental cooling system, and ECI engineered electronic controls. This system enables converted engines to operate on 90% natural gas while maintaining engine efficiency and fully rated horsepower. Dual-fuel operation is completely automated, requiring no user input. If a function falls out of normal operational limits, full diesel operation is activated instantly with no interruption of service.

ECI dual-fuel systems provide substantial emissions improvements over unmodified counterparts, reducing NO_x emissions by 66% in locomotive applications, with further improvement in stationary installations. ECI conversion systems are currently saving one of their offshore drilling customers \$4,000 per day in fuel costs with additional savings as a result of the reduced cost of maintenance from burning a cleaner fuel.



Dual-Fuel Engine

Overview

- ◆ Commercialized by Energy Conversions Inc. (ECI)
- ◆ Commercialized in 1992
- ◆ In 2002 there are 23 installations world-wide, 12 in the United States

Applications

A fuel-powered, liquefied, compressed or pipeline natural gas conversion kit for General Motors EMD series industrial power engines used as stationary generators, drilling platforms, marine vessels and locomotives worldwide. ECI also produces a similar system for the Caterpillar 379, 398, and 399 series engines

Capabilities

This conversion system, which uses a fuel with a readily available and abundant supply, results in a reduction of emissions released into the atmosphere, especially particulates and NO_x.

Benefits

Energy Cost Savings

Provides increased flexibility in fuel use thus resulting in cost savings to users.

Emissions

Reduces amount of emissions released into the atmosphere, especially particulates and NO_x. NO_x emissions are reduced by up to 66%.

Maintenance Cost Reduction

Reduces engine maintenance because it burns a cleaner fuel.

Operating Labor Reduction

Pipeline fuel supply reduces refueling labor, and liquefied natural gas systems have larger fuel storage so they need less frequent refueling.

Waste Reduction

Reduces oil and filter replacement and disposal.